## LETTERS TO THE EDITOR.

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### Acquired Characters and Stimuli.

DR. ARCHDALL REID is usually so luminous in his statements concerning heredity that I hesitate to express my disagreement with what he has written in NATURE of February 29, and elsewhere previously, as to the use of the term "acquired characters." It is, of course, true with regard to this term, as with regard to a great many others, that it can be interpreted to mean what its original user, namely, Lamarck, did *not* mean. But I cannot see that anything is gained by so doing. On the contrary, in such cases it seems to me best to endeavour to keep the term for what its introducer meant by it. I also fail to see any advantage in grouping together the various necessary chemical and physical environments of a living thing under the word "stimuli." They do not become changed in nature by the application to them of that term, which is customarily used with more limited application.

It is, of course, true (and I should suppose thoroughly familiar to every biologist) that the reproductive germ of an organism unfolds or "develops" in response to the action upon it of certain surrounding conditions—its environment. When those conditions are "normal," a normal germ develops in response to them—the normal characters of the species. When the conditions to which the young organism is exposed are in some limited degree and in regard to certain ascertainable factors abnormal, the organism develops (in some cases) one or more abnormal characters differing from those developed by an otherwise equivalent specimen retained in the normal environment. The new character or characters developed in response to the abnormal environment (which we assume to be allowed to act on the growing young organism only, and *not* on its parents) are called by Lamarck—and by those who wish to discuss Lamarck's theory—"acquired characters" (*changements acquis*). The word "acquire" is used to mean "something added to" or "changed in" the normal form of the species.

It is not, I think, permissible to say that the normal characters which arise in response to normal conditions are with equal fitness to be described as "acquired." Of course, *all* the characters successively developed by a growing reproductive germ or young organism *may* be spoken of as "acquired" by the organism during its growth from extreme youth to age. But to do so when discussing Lamarck's theory is deliberately to create confusion. The thing in addition to and upon which "acquirements" are made is, in Lamarck's use of the word "acquire," not the growing individual, but the normal specific form as exhibited in normal individuals. That, I take it, is Lamarck's meaning, and it is that which I and others have for more than twenty-five years accepted. I am sorry to say that to use the word "acquired" at this period of a historical discussion, in another sense, is what an unfriendly critic (which I am not) would call "quibbling," and, moreover, quibbling without any discernible object or purpose.

I should like once more to point out (as I did many years ago in a similar correspondence in these pages) that the measurable factors of the normal environment of a species of plant or animal often exhibit within that normal limit a great range in quantity and intensity. This range differs in different species and groups of organisms, but, as a rule, the normal specific form is developed under conditions which are not very closely limited. A species is usually so "wound up" (to use a metaphor) as to be stable under a wide range of conditions. Outside that range we find first a zone or area of excess or decrease of one or more factors of environment, such as heat, light, moisture, mechanical pressure, chemical character of food, &c., within which the organism still flourishes whilst giving *new* or *abnormal* responses to the *new* and *abnormal* quantities of the environmental factors. These responses are Lamarck's *changements acquis*—our "acquired characters"—characters which are not those of the species when existing in the by no means narrowly limited range of factors which are its normal environment.

Beyond this zone or area of *potential* (or tolerable) environment with its corresponding *potential* development of acquired characters not normal to the species in normal environment, we come to a further zone of larger increase or decrease of environmental factors. Here the organism does not respond as a living thing; it has no reserved potentialities which are called into activity by this further increase or decrease of one or more of the factors of the environment; the environment has become impossible or destructive, and the organism ceases to live.

It is important to distinguish these three zones of limitation in increase or decrease of factors of the environment for every species, the normal, the potential, and the destructive. It is a necessary part of bionomic inquiry to determine the range *plus* and *minus* of the several factors of each quality of environment—normal, potential, and destructive—in regard to whole series of species of both plants and animals.

E. RAY LANKESTER.

Bournemouth, March 9.

### Coordinated Purchase of Periodicals in two Newcastle Libraries.

IN 1905 Dr. Thomas Muir read a paper before the Royal Society of Edinburgh entitled "Library Aids to Mathematical Research," in which he urged that unnecessary duplication in the purchase of periodicals should be avoided by adjacent libraries. The matter has been taken up in NATURE, *e.g.* in vol. lxxxvii., p. 222. The following brief account of what is being done in this regard in Newcastle-upon-Tyne may therefore be of interest.

In 1908 representatives of several Newcastle institutions met in the Public Library, at the invitation of the public librarian (Mr. Basil Anderton), to consider whether any coordination could be effected as regards the purchase of certain learned societies' journals and some of the more expensive and less used periodicals. Armstrong College was represented by Profs. Bedson and Jessop. Prof. Duff, who had for a considerable time manifested cordial sympathy with the project, was unavoidably absent from the meeting. In the course of discussion various journals were named in regard to which concerted action seemed desirable, but for one reason or another, while the principle was commended, only the representatives of the Public Library and Armstrong College were at the time ready to take practical steps in the matter.

Prof. Jessop moved that a beginning be made with certain mathematical journals, and that of those that were being bought in duplicate (one by each institution) some be discontinued, and that the money so set free be applied to the covering of fresh ground. The suggestion, as modified by discussion and finally moved by Prof. Jessop, was approved, and the public

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librarian embodied it in a recommendation which he laid before the Public Libraries Committee, which resolved that the Public Library should stop taking in the following:—London Mathematical Society Proceedings; *Journal de Mathématiques*; *Quarterly Journal of Mathematics*; *Fortschritte der Mathematik*; *Mathematische Annalen*; and should take instead: *Annali di Matematica: Tortolini*; *Bulletin de la Société Mathématique de France*; *Atti dei Lincei*; *Zeitschrift für Mathematik: Schlömilch*; *Giornale di Matematiche: Battaglini.*

The Public Library periodicals were to be stored so as to be accessible to Armstrong College readers, duly accredited, for consultation in the library and for use at home. For future volumes of the first set of periodicals, properly accredited Public Library readers were to have similar access to Armstrong College volumes.

A copy of the resolution was sent to the Library Committee of Armstrong College, which likewise adopted it. The curators of Armstrong College Library (Profs. Bedson and Duff) and the public librarian were then in a position to carry the scheme into practical working. They decided the appropriate dates for discontinuing old periodicals and for starting new ones; they arranged that the students of each library should be admitted to corresponding privileges in the other library; and they drafted and printed the necessary regulations and forms.

As the scheme was found to work satisfactorily for the mathematical section, the committees concerned authorised extension of the idea. The officers accordingly made further revisions in other subjects, at meetings which they held from time to time. The classical section was first dealt with, and the responsibility of providing the leading periodicals was allocated to one institution or the other. Other sections were dealt with in due course. In this way all the more important journals taken by the two institutions (scientific, historical, philosophical) have been assigned to one or other of the libraries, with the result that unnecessary duplication of expenditure is now avoided. Naturally, a certain amount of duplication is still necessary, since a single copy will not always answer the needs of students. But the general result is that a good deal of money has been set free, and has been used for covering fresh ground.

The same principle has also, to some extent, been adopted as regards buying expensive books, of which one copy in the town is sufficient. It may be added that, as a side issue of this cooperation, there will shortly appear, in a catalogue which the Public Library is issuing, the titles of a number of interesting books on classical subjects which the library of Armstrong College possesses, but which are not duplicated in the Public Library.

Basil Anderton.

Public Library, Newcastle-upon-Tyne.

### Mars and a Lunar Atmosphere.

In his interesting letter on the above subject in Nature of March 7, Mr. Whitmell is quite correct where he mentions that the moon was at full on October 16, 1902, when, according to my note, Prof. Luther observed an occultation of Mars. In fact, there was a total eclipse that night, and that was the phenomenon which Prof. Luther actually observed.

The abridgment of a previously condensed translation led to the substitution of the misleading "similar," and I must apologise to Mr. Whitmell for the trouble this may have caused him in looking the matter up. Prof. Luther on that occasion observed a section of a dark concentric ring bordering the small crescent of the nearly totally eclipsed moon, and this he suggested might be caused by the absorption of a fairly extensive atmosphere.

The Writer of the Note.

### Observed Fall of an Aërolite near St. Albans.

Under the above heading in the issue of Nature for last week I reported upon the circumstances and other details of a supposed fall of a meteorite during the storm of March 4, as described to me by an observer, Mr. H. L. G. Andrews, at Colney Heath, near St. Albans. I have now submitted the stone for examination to Dr. George T. Prior, of the British Museum (Natural History), who informs me that it is not of meteoric origin.

G. E. Bullen.

Hertfordshire Museum, St. Albans, March 16.

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## *THE INFLUENCE OF WEATHER ON BEES.*

Although all who are interested in bees, either from the scientific or the commercial and practical sides, are agreed that the weather plays a most important part in their lives, very little appears to have been done to ascertain the exact effects which different kinds of weather have upon them. The reason may well be that those who are interested in bees from a practical point of view would not be able to devote the time necessary to the making of elaborate observations of the weather and the weighing of colonies daily, to say nothing of the laborious calculation necessary to ascertain the results of the observations.

In the autumn of 1910, the so-called Isle of Wight disease was raging very fiercely in the southern counties, and to account for the widespread character of the scourge, many beekeepers advanced the idea that a succession of bad seasons was responsible to a great extent, if not entirely, for the trouble.

It seemed to me that the proper course to pursue was to make a long series of observations in order to find out what particular kinds of weather were most conducive to the well-being of bees or the reverse. I therefore commenced, in April of 1911, a series of experiments. Commencing with a strong colony, which weighed with its hive 39 lb. on April 20, I began to weigh it every evening, and on May 5, for the sake of comparison, I also weighed a weak colony. This only weighed with its hive 36½ lb., the other being on that date 8 lb. heavier. The bees were hybrids, an excellent and good-tempered variety, eminently suitable for experiments, though not the best of honey gatherers.

The queens of both colonies were sisters, that of the strong one having been raised in 1909, and that of the weak one in 1910. It is pretty universally agreed among beekeepers that a queen in her second year is at her best, and according to this idea, which is quite sound, the weaker colony should have done better than the other, but there is a factor in the situation which is really more important than the age of the queen. This is the amount of stores possessed by the colony at the commencement of the season. Should there be a shortage of stores, breeding is much slower;

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